PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference M/46254-PCT	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/EP2006/068880	International filing date *(day/month/year)* 24.11.2006	Priority date *(day/month/year)* 25.11.2005
International Patent Classification (IPC) or national classification and IPC INV. A01N43/10		
Applicant BASF Aktiengesellschaft		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 8 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 14 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☒ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
2007-09-24	22.02.2008
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Cooper, Simon Telephone No. +49 89 2399-8323

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2006/068880

Box No. I Basis of the report

1. With regard to the **language**, this report is based on

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3(a) and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4(a))
   - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-97 as originally filed

   Claims, Numbers

   1-29 filed with telefax on 24.09.2007

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☒ the claims, Nos. 28
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

5. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 70.2 (e)).

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-27
	No:	Claims	28,29
Inventive step (IS)	Yes:	Claims	1-27
	No:	Claims	28,29
Industrial applicability (IA)	Yes:	Claims	1-29
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

D1: WO 2005/035486 A (BASF AG [DE]; VON DEYN WOLFGANG [DE]; BAUMANN ERNST [DE]; HOFMANN MICH) 21 April 2005 (2005-04-21) cited in the application

D2: EP-A1-0 033 984 (DUPHAR INT RES [NL]) 19 August 1981 (1981-08-19) cited in the application

D5: EP-A1-0 795 548 (SUNTORY LTD [JP]) 17 September 1997 (1997-09-17)

D6: DATABASE CAPLUS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; FUJITA, REIKO ET AL: "Diels-Alder reaction of N-sulfonylpyridones with 1,3-butadiene" XP002425929 retrieved from STN Database accession no. 2004:985121

D7: DATABASE CAPLUS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; NEGRIMOVSKY, V. M. ET AL: "Synthesis of sulfonated 1,2-dicyanobenzenes" XP002425930 retrieved from STN Database accession no. 1995:755503

D16: DATABASE CAPLUS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; KAJINO, MASAHIRO ET AL: "Preparation of pyrrole derivatives as proton pump inhibitors" XP002435280 retrieved from STN Database accession no. 2006:317436

Section I.

1). The removal of the qualification that the 3- to 7-membered heterocyclyl or heterocyclylalkyl in R16 be saturated or partially unsaturated means that such residues which are fully unsaturated are now incorporated in the application. These were not, however, originally disclosed, leading to an objection under Rule 70.2© PCT.

2). No basis could be found in the application as filed for R9 and R16 together forming a saturated or ethylenically unsaturated 6-membered ring. In this context it is noted that individual examples which may have specific sub-species of such 6-membered rings may not be used to establish the general term. An objection also arises under Rule 70.2© PCT in this respect.

3). This report is established as if the two amendments identified above had not been

made.

Section IV.

The following inventions are seen in the present application:

I) Claims 1-29 (partly)

Compounds of the formula I in which A is N=CR5R6 or N=SR7R8, methods of combatting animal pests using said compounds of formula I, seed comprising said compounds of formula I, use of the said compounds of formula I for combatting animal pests and an agricultural composition comprising said compounds of formula I.

ii) Claims 1-29 (partly)

Open chain compounds of the formula I in which A is NR10-C(=X)R9 and related cyclic derivatives formed by combination of R9 and R10, R9 and R11, R9 and R16, or R10 and R11, methods of combatting animal pests using said compounds of formula I, seed comprising said compounds of formula I, use of the said compounds of formula I for combatting animal pests and an agricultural composition comprising said compounds of formula I.

iii) Claims 1-29 (partly)

Compounds of the formula I in which A is an N-bound 5-7 membered heterocycle which is ethylenically unsaturated or aromatic and which may carry 1-4 substituents selected from R13, methods of combatting animal pests using said compounds of formula I, seed comprising said compounds of formula I, use of the said compounds of formula I for combatting animal pests and an agricultural composition comprising said compounds of formula I.

A problem implicit to the present application is the provision of compounds which have a stronger pesticidal activity than those according to D1 and D2 (cf. p.1, lines

15-17). However, since no data have been supplied that would establish that an improved effect over D1 and D2 had credibly been achieved over the entire scope of the claims, the problem on which the present application is based reduces to one of providing alternative pesticides. The solution to this problem is the compounds of formula I used in the method of claim 1, some of which are also claimed as such in claim 28. Common to all these compounds is a benzonitrile nucleus having a substituted aminothio substituent ortho to the nitrile group. However, all the pesticides according to D1 and D2 show this nucleus also. This is readily apparent from claim 1 of D1; in D2 R1 in claim 1 is always a nitrile group and R2 is always attached via a nitrogen. The moiety common to the present pesticides is thus not characteristic in view of the art relating to pesticides and the present application lacks unity. Since the substituents of the present group A give rise to novelty over the pesticides of D1 and D2, the application has been divided up along these lines.

Section V.

Invention (I)

1). The compounds according to invention (I) identified above differ from those according to D1 and D2 by having an alkylidene or doubly bound sulphur atom attached to the sulphonamide nitrogen rather than two singly bound atoms as in the case of the compounds according to D1 and D2. The methods using such compounds, their use, the compounds themselves, seeds treated with them and compositions containing them are thus novel.

2). The object of the present application is to provide alternative compounds having a pesticidal activity. This problem has been solved by the compounds according to invention (I) identified above as has been shown by activity data submitted for a representative selection of such compounds.

3). In view of the structural differences between the present compounds and those according to D1 as elucidated above, it could not be expected that the present compounds would also have a pesticidal activity. Invention (I) above is thus seen as fulfilling the requirements of Art. 33(3) PCT.

Invention (ii)

4). No compounds of the formula given for invention (ii) could be found disclosed for use in a process for combatting pests. Furthermore, no disclosure of a seed having been treated with a compound having the formula specified for invention (ii) could be found in the prior art. The subject-matter of claims 1-27 is novel.

5). Claim 28 lacks novelty over the compound according to example 8 of D5. Since claim 28 of the present application and claim 1 of D5 overlap and a specific example of the D5 falls within the area of overlap, the whole of this area of overlap is seen as being novelty-destroying for the present claim 28.

6). Since the pharmaceutical compositions disclosed by D5 are deemed indistinguishable from the agricultural compositions according to the present claim 29, point 5 above applies mutatis mutandis to the present claim 29.

7). The object of the present application as embodied by the present invention (ii) can be seen in the provision of pesticides which are improved with respect to those according to D2.

8). The solution to this problem is to provide compounds which may differ from those according to D2 by as little as replacing a methylene group of R2 being alkyl in D2 by the present group -(C=O)-. Experimental data have been provided to show that the effect is achieved. That an improvement in pesticidal activity could be achieved by this structural change could not be foreseen and is deemed indicative of inventive activity in claims 1-27 insofar as they relate to invention (ii).

Invention (iii).

9). Claim 28 lacks novelty with respect to the compounds individualised in D6 and D7 and the compounds individualised in D16. Because the present claim 28 overlaps with the claim in D16 and individualised compounds of the document fall within the area of overlap, the whole of the area of overlap is regarded as novelty-destroying. The compounds according to D16 are medicaments. Since this at least implies a pharmaceutically acceptable carrier for the compounds, and since such carriers are regarded as also being agriculturally acceptable, the preceding comments on claim

28 in view of D16 apply mutatis mutandis to claim 29 with respect to D16. D16 is a document which can be taken into account for the assessment of novelty in the European patent system irrespective of whether the present priority date has been validly claimed or not.

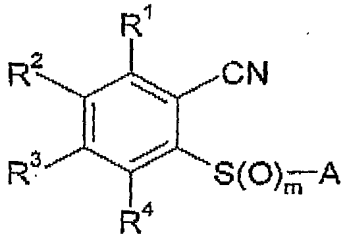
10). No disclosure of compounds having the formula described in formula (iii) above having utility in combatting animal pests, nor their application to seeds, could be found in the prior art. Insofar as claims 1-27 relate to invention (iii), they are novel.

11). The object of invention (iii) is to provide alternative compounds effective in combatting animal pests. The solution to this problem is the compounds described above under (iii). The problem has been credibly solved by these compounds as demonstrated by experimental data.

12). The present compounds differ from those according to claim 1 of D2 in having A as an N-bound heterocycle rather than a saturated N-bound heterocycle (a possible definition of R2 in D2). It could not be predicted, however, that a change of this order of magnitude would lead to alternative compounds having the same effect. The subject-matter of the present claims 1-27 insofar as they relate to invention (iii) are thus seen as being based on an inventive step.

We claim:

1. A method of combating animal pests which comprises contacting the animal pests, their habit, breeding ground, food supply, plant, seed, soil, area, material or environment in which the animal pests are growing or may grow, or the materials, plants, seeds, soils, surfaces or spaces to be protected from animal attack or infestation with a pesticidally effective amount of at least one cyanobenzene compound of the formula I and/or at least one agriculturally acceptable salt thereof:



(I)

where

m is 0, 1 or 2;

A is a radical of the formulae
$N=CR^5R^6$, $N=SR^7R^6$, NR^{10}-C(=X)-R^9,
where X is O or S,

or A is a N-bound 5-, 6- or 7-membered heterocycle, which is ethylenically unsaturated or aromatic, and which additionally may contain 1, 2, or 3 further heteroatoms or heteroatom groups, selected from O, S, SO, SO_2, N, and NR^{12}, and/or 1, 2 or 3 carbonyl groups as ring members and which may carry 1, 2, 3 or 4 radicals R^{13},

R^1 is hydrogen, nitro, cyano, azido, amino, halogen, sulfenylamino, sulfinylamino, sulfonylamino, C(=O)R^{14}, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_1-C_6-alkoxy, (C_1-C_6-alkyl)amino, di(C_1-C_6-alkyl)amino, C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl or C_1-C_6-alkylsulfonyl, wherein the ten last-mentioned radicals may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, selected from the group consisting of cyano, nitro, amino, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio, (C_1-C_4-alkoxy)carbonyl, (C_1-C_4-alkyl)amino, di(C_1-C_4-alkyl)amino, C_3-C_8-cycloalkyl and phenyl, it be-

21.09.2007

ing possible for phenyl to be unsubstituted, partially or fully halogenated and/or to carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy;

R^2, R^3 and R^4 are independently of one another selected from the group consisting of hydrogen, halogen, cyano, azido, nitro, C_1-C_6-alkyl, C_3-C_8-cycloalkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio, C_2-C_6-alkenyl, C_2-C_6-alkynyl, amino, (C_1-C_4-alkyl)amino, di(C_1-C_4-alkyl)amino, sulfonylamino, sulfinylamino, sulfenylamino and C(=O)-R^{15};

R^5 is H, OR^{5a}, $NR^{5b}R^{5c}$, aryl, aryl-C_1-C_4-alkyl, heteroaryl, heteroaryl-C_1-C_4-alkyl, heterocyclyl, heterocyclyl-C_1-C_4-alkyl, C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl, C_1-C_{10}-alkylthio, C_1-C_{10}-alkylsulfonyl, C_1-C_{10}-alkylsulfinyl, wherein the five last-mentioned radicals may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, independently of one another each selected from the group consisting of cyano, nitro, amino, C_1-C_{10}-alkoxy, C_1-C_{10}-alkylthio, C_1-C_{10}-alkylsulfinyl, C_1-C_{10}-alkylsulfonyl, C_1-C_{10}-haloalkoxy, C_1-C_{10}-haloalkylthio, C_1-C_{10}-alkoxycarbonyl, (C_1-C_{10}-alkyl)amino, di-(C_1-C_{10}-alkyl)amino, C_3-C_{10}-cycloalkyl and phenyl, it being possible for phenyl to be unsubstituted, partially or fully halogenated and/or to carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy;

wherein

R^{5a} is C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, aryl, aryl-C_1-C_4-alkyl, heteroaryl or heteroaryl-C_1-C_4-alkyl, heterocyclyl or heterocyclyl-C_1-C_4-alkyl;

R^{5b}, R^{5c}, independently from each other, are selected from hydrogen, C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, aryl, aryl-C_1-C_4-alkyl, heteroaryl and heteroaryl-C_1-C_4-alkyl, heterocyclyl or heterocyclyl-C_1-C_4-alkyl;

wherein C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl, C_2-C_{10}-alkenyl and C_2-C_{10}-alkynyl in R^{5a}, R^{5b} and R^{5c} may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, selected from the group consisting of cyano, nitro, amino, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio, (C_1-C_4-alkoxy)carbonyl,

(C_1-C_4-alkyl)amino, di(C_1-C_4-alkyl)amino and C_3-C_8-cycloalkyl;

wherein the heteroaryl moiety in heteroaryl and heteroaryl-C_1-C_4-alkyl of R^5, R^{5a}, R^{5b} and R^{5c} is 5- or 6 membered and contains 1, 2, 3 or 4 heteroatoms and/or heteroatom groups, selected from O, S, SO, SO_2, N or NR^a, as ring members, R^a being hydrogen or C_1-C_6-alkyl;

wherein the heterocyclyl moiety in heterocyclyl and heterocyclyl-C_1-C_4-alkyl of R^5, R^{5a}, R^{5b} and R^{5c} is 3- to 7 membered, is saturated or partly unsaturated and contains 1, 2, 3 or 4 heteroatoms and/or heteroatom groups, selected from O, S, SO, SO_2, N or NR^b, as ring members, R^b being hydrogen or C_1-C_6-alkyl, and additionally may contain 1, 2 or 3 CO groups as ring members;

and wherein the carbon atoms of aryl, hetaryl, and heterocyclyl moieties in R^5, R^{5a}, R^{5b} and R^{5c} may be unsubstituted or may carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of halogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy;

R^6 independently has one of the meanings given for R^5;

R^7, R^8, independently from each other, are selected from aryl, aryl-C_1-C_4-alkyl, heteroaryl, heteroaryl-C_1-C_4-alkyl, heterocyclyl, heterocyclyl-C_1-C_4-alkyl, C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl, C_2-C_{10}-alkenyl and C_2-C_{10}-alkynyl, wherein the four last-mentioned radicals may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, independently of one another each selected from the group consisting of cyano, nitro, amino, C_1-C_{10}-alkoxy, C_1-C_{10}-alkylthio, C_1-C_{10}-alkylsulfinyl, C_1-C_{10}-alkylsulfonyl, C_1-C_{10}-haloalkoxy, C_1-C_{10}-haloalkylthio, C_1-C_{10}-alkoxycarbonyl, (C_1-C_{10}-alkyl)amino, di-(C_1-C_{10}-alkyl)amino, C_3-C_{10}-cycloalkyl and phenyl, it being possible for phenyl to be unsubstituted, partially or fully halogenated and/or to carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy; or

R^7 and R^8 together with the sulfur atom they are bound to form a saturated or ethylenically unsaturated 5- to 10-membered ring, optionally substituted by 1, 2, 3 or 4 radicals selected from C_1-C_5-alkyl and halogen, wherein the ring may contain, in addition to the sulfur atom, 1, 2 or 3 heteroatoms and/or

heteroatom-containing groups as ring members selected from the group consisting of nitrogen, oxygen, sulfur, CO, SO, SO_2 and N-R^{17};

wherein the heteroaryl moiety in heteroaryl and heteroaryl-C_1-C_4-alkyl of R^7 and R^8 is 5- or 6 membered and contains 1, 2, 3 or 4 heteroatoms and/or heteroatom groups, selected from O, S, SO, SO_2, N or NR^c, as ring members, R^c being hydrogen or C_1-C_6-alkyl,

wherein the heterocyclyl moiety in heterocyclyl and heterocyclyl-C_1-C_4-alkyl of R^7 and R^8 is 3- to 7-membered, is saturated or partly unsaturated and contains 1, 2, 3 or 4 heteroatoms and/or heteroatom groups, selected from O, S, SO, SO_2, N or NR^d, as ring members, R^d being hydrogen or C_1-C_6-alkyl, and additionally may contain 1, 2 or 3 CO groups as ring members,

and wherein the carbon atoms of aryl, hetaryl, and heterocyclyl in R^7 and R^8 may be unsubstituted or may carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of halogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy;

R^9 is selected from the group consisting of hydrogen, OR^{9a}, $NR^{9b}R^{9c}$, aryl, aryl-C_1-C_4-alkyl, heteroaryl, heteroaryl-C_1-C_4-alkyl, heterocyclyl, heterocyclyl-C_1-C_4-alkyl, C_1-C_{10}-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl and C_3-C_{10}-cycloalkyl, wherein the four last-mentioned radicals may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, independently of one another each selected from the group consisting of cyano, nitro, amino, C_1-C_{10}-alkoxy, C_1-C_{10}-alkylthio, C_1-C_{10}-alkylsulfinyl, C_1-C_{10}-alkylsulfonyl, C_1-C_{10}-haloalkoxy, C_1-C_{10}-haloalkylthio, C_1-C_{10}-alkoxycarbonyl, (C_1-C_{10}-alkyl)amino, di-(C_1-C_{10}-alkyl)amino, C_3-C_{10}-cycloalkyl and phenyl, it being possible for phenyl to be unsubstituted, partially or fully halogenated and/or to carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy,

and wherein

R^{9a} is C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, aryl, aryl-C_1-C_4-alkyl, heteroaryl or heteroaryl-C_1-C_4-alkyl, heterocyclyl or heterocyclyl-C_1-C_4-alkyl,

R^{9b}, R^{9c}, independently from each other, are selected from hydrogen, C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, aryl, aryl-

C_1-C_4-alkyl, heteroaryl and heteroaryl-C_1-C_4-alkyl, heterocyclyl or heterocyclyl-C_1-C_4-alkyl,

wherein C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl, C_2-C_{10}-alkenyl and C_2-C_{10}-alkynyl in R^{9a}, R^{9b} and R^{9c} may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, selected from the group consisting of cyano, nitro, amino, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio, (C_1-C_4-alkoxy)carbonyl, (C_1-C_4-alkyl)amino, di(C_1-C_4-alkyl)amino and C_3-C_6-cycloalkyl,

wherein the heteroaryl moiety in heteroaryl and heteroaryl-C_1-C_4-alkyl of R^9, R^{9a}, R^{9b} and R^{9c} is 5- or 6-membered and contains 1, 2, 3 or 4 heteroatoms and/or heteroatom groups, selected from O, S, SO, SO_2, N or NR^e, as ring members, R^e being hydrogen or C_1-C_6-alkyl,

wherein the heterocyclyl moiety in heterocyclyl and heterocyclyl-C_1-C_4-alkyl of R^9, R^{9a}, R^{9b} and R^{9c} is 3- to 7-membered, is saturated or partly unsaturated and contains 1, 2, 3 or 4 heteroatoms and/or heteroatom groups, selected from O, S, SO, SO_2, N or NR^f, as ring members, R^f being hydrogen or C_1-C_6-alkyl, and additionally may contain 1, 2 or 3 CO groups as ring members,

and wherein the carbon atoms of aryl, hetaryl and heterocyclyl moieties in R^9, R^{9a}, R^{9b} and R^{9c} may be unsubstituted or may carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of halogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy;

R^{10} is selected from the group consisting of hydrogen, C(=O)-R^{16}, C_1-C_{10}-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_{10}-alkoxy and C_3-C_{10}-cycloalkyl, wherein the five last-mentioned radicals may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, independently of one another each selected from the group consisting of cyano, nitro, amino, C_1-C_{10}-alkoxy, C_1-C_{10}-alkylthio, C_1-C_{10}-alkylsulfinyl, C_1-C_{10}-alkylsulfonyl, C_1-C_{10}-haloalkoxy, C_1-C_{10}-haloalkylthio, C_1-C_{10}-alkoxycarbonyl, (C_1-C_{10}-alkyl)amino, di-(C_1-C_{10}-alkyl)amino, C_3-C_{10}-cycloalkyl and phenyl, it being possible for phenyl to be unsubstituted, partially or fully halogenated and/or to carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy; or

R^9 and R^{10} together with the adjacent nitrogen and carbon atoms form a saturated or ethylenically unsaturated 5 to 10-membered ring, optionally substituted by 1, 2, 3 or 4 radicals selected from C_1-C_5-alkyl and halogen, wherein the ring may contain, in addition to the nitrogen and carbon ring members, 1, 2 or 3 heteroatoms and/or heteroatom groups as ring members selected from the group consisting of nitrogen, oxygen, sulfur, CO, SO, SO_2 and N-R^{17};

R^{12} is hydrogen, C_1-C_6-alkyl, C_1-C_4-alkoxy-C_1-C_4-alkyl or C_1-C_6-alkoxy;

each R^{13} independently is selected from halogen, cyano, nitro, sulfenylamino, sulfinylamino, sulfonylamino, aryl, aryl-C_1-C_4-alkyl, heteroaryl, heteroaryl-C_1-C_4-alkyl, heterocyclyl, heterocyclyl-C_1-C_4-alkyl, C_1-C_6-alkyl, C_3-C_8-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylcarbonyl, (C_1-C_6-alkyl)amino, di(C_1-C_6-alkyl)amino, C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl or C_1-C_6-alkylsulfonyl, wherein the ten last-mentioned radicals may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, selected from the group consisting of cyano, nitro, amino, OH, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio, C_1-C_4-alkylcarbonyloxy, (C_1-C_4-alkoxy)carbonyl, (C_1-C_4-alkyl)amino, di(C_1-C_4-alkyl)amino, C_3-C_8-cycloalkyl and phenyl, it being possible for phenyl to be unsubstituted, partially or fully halogenated and/or to carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy,

wherein the heteroaryl moiety in heteroaryl and heteroaryl-C_1-C_4-alkyl of R^{13} is 5- or 6 membered and contains 1, 2, 3 or 4 heteroatoms and/or heteroatom groups, selected from O, S, SO, SO_2, N or NR^g, as ring members, R^g being hydrogen or C_1-C_6-alkyl,

wherein the heterocyclyl moiety in heterocyclyl and heterocyclyl-C_1-C_4-alkyl of R^{13} is 3- to 7-membered and contains 1, 2, 3 or 4 heteroatoms and/or heteroatom groups, selected from O, S, SO, SO_2, N or NR^h, as ring members, R^h being hydrogen or C_1-C_6-alkyl, and additionally may contain 1, 2 or 3 CO groups as ring members,

and wherein the carbon atoms of aryl, hetaryl, and heterocyclyl in R^{13} may be unsubstituted or may carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of halogen, C_1-C_4-alkyl, C_1-C_4-

haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy;

R^{14} and R^{15}, independently of one another, are selected from the group consisting of hydrogen, hydroxy, C_1-C_6-alkoxy, amino, C_1-C_4-alkylamino, di(C_1-C_4-alkyl)amino, aryl, aryl-C_1-C_4-alkyl, C_1-C_4-alkyl, where the alkyl moiety in the two last-mentioned radicals and the aryl moiety in aryl or aryl-C_1-C_4-alkyl may be partially or fully halogenated,

3- to 7-membered heteroaryl or heteroaryl-C_1-C_4-alkyl, wherein the heteroaryl ring contains as ring members 1, 2 or 3 heteroatoms and/or heteroatom groups, selected from the group consisting of nitrogen, oxygen, sulfur, SO, SO_2 and N-R^n, wherein R^n is hydrogen or C_1-C_4-alkyl,

3- to 7-membered heterocyclyl or heterocyclyl-C_1-C_4-alkyl, wherein the heterocyclic ring is saturated or partly unsaturated and contains 1, 2 or 3 heteroatoms and/or heteroatom groups, selected from the group consisting of nitrogen, oxygen, sulfur, group SO, SO_2 and N-R^o, wherein R^o is hydrogen or C_1-C_4-alkyl,

and wherein the carbon atoms of the heterocyclic rings may be unsubstituted or substituted by 1 or 2 radicals selected from halogen or C_1-C_4-alkyl;

R^{16} is C_1-C_6-alkyl, aryl, aryl-C_1-C_4-alkyl,
5- to 7-membered heteroaryl or heteroaryl-C_1-C_4-alkyl, wherein the heteroaryl ring contains as ring members 1,2 or 3 heteroatoms and/or heteroatom groups, selected from the group consisting of nitrogen, oxygen, sulfur, SO, SO_2 and N-R^k, wherein R^k is hydrogen or C_1-C_4-alkyl,

3- to 7-membered heterocyclyl or heterocyclyl-C_1-C_4-alkyl, wherein the heterocyclic ring is saturated or partly unsaturated and contains as ring members 1, 2 or 3 heteroatoms and/or heteroatom groups, selected from the group consisting of nitrogen, oxygen, sulfur, SO, SO_2 and N-R^m, wherein R^m is hydrogen or C_1-C_4-alkyl,

and wherein the carbon atoms of the heterocyclic rings may be unsubstituted or substituted by 1 or 2 radicals selected from halogen or C_1-C_4-alkyl;

or

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R^{16} and R^9 together with the adjacent nitrogen and carbon atoms form a saturated or ethylenically unsaturated 5 to 10-membered ring, where the ring may be partially or fully halogenated and/or may be substituted by 1, 2 or 3 substituents selected from C_1-C_5-alkyl and C_1-C_5-haloalkyl, wherein the ring may contain, in addition to the nitrogen and carbon ring members, 1, 2 or 3 heteroatoms and/or heteroatom groups as ring members selected from the group consisting of nitrogen, oxygen, sulfur, SO, SO_2 and N-R^{17};

each R^{17} independently is hydrogen, heteroaryl, heteroaryl-C_1-C_4-alkyl or C_1-C_6-alkyl, where the alkyl moiety in the two last-mentioned radicals may be partially or fully halogenated;

and/or the agriculturally acceptable salts thereof.

2. The method as claimed in claim 1, wherein m in formula I is 2.

3. The method as claimed in any of the preceding claims, wherein R^1 in formula I is different from hydrogen.

4. The method as claimed in claim 3, wherein R^1 is selected from halogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy.

5. The method as claimed in any of the preceding claims, wherein two of the radicals R^2, R^3 and R^4 in formula I are hydrogen and the remaining radical of R^2, R^3 or R^4 is selected from halogen, C_1-C_4-alkyl, and C_1-C_4-haloalkyl.

6. The method as claimed in any of claims 1 to 4, wherein all of the radicals R^2, R^3 and R^4 in formula I are hydrogen.

7. The method as claimed in any of the preceding claims, wherein A is a radical N=C$R^5$$R^6$, wherein R^5 and R^6 are as defined in claim 1.

8. The method as claimed in claim 7, wherein

R^5 is C_1-C_6-alkyl or a radical OR^{5a}, and

R^6 is a radical OR^{6a}

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wherein R^{5a} and R^{6a} have, independently of each other, one of the meanings given for R^{5a} in claim 1.

9. The method as claimed in claim 8, wherein R^{5a} and R^{6a} are, independently of each other, selected from C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_4-alkoxy-C_1-C_4-alkyl and C_1-C_4-haloalkyl.

10. The method as claimed in claim 7, wherein

R^5 is C_1-C_6-alkyl, which may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, selected from the group consisting of cyano, nitro, amino, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio, (C_1-C_4-alkoxy)carbonyl, (C_1-C_4-alkyl)amino, di(C_1-C_4-alkyl)amino and C_3-C_8-cycloalkyl, or is phenyl or phenyl-C_1-C_4-alkyl, wherein the phenyl group in the two last-mentioned radicals may be unsubstituted or may carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of halogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy; and

R^6 is hydrogen, C_1-C_6-alkyl, which may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, selected from the group consisting of cyano, nitro, amino, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio, (C_1-C_4-alkoxy)carbonyl, (C_1-C_4-alkyl)amino, di(C_1-C_4-alkyl)amino and C_3-C_8-cycloalkyl, or is phenyl or phenyl-C_1-C_4-alkyl, wherein the phenyl group in the two last-mentioned radicals may be unsubstituted or may carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of halogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy.

11. The method as claimed in claim 10, wherein

R^5 is selected from C_1-C_6-alkyl, C_1-C_4-alkoxy-C_1-C_4-alkyl, C_1-C_4-haloalkyl and phenyl-C_1-C_4-alkyl, wherein phenyl may be unsubstituted, partially or fully halogenated and/or carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy; and

R^6 is selected from hydrogen, C_1-C_6-alkyl, C_1-C_4-alkoxy-C_1-C_4-alkyl, C_1-C_4-haloalkyl and phenyl-C_1-C_4-alkyl, wherein phenyl may be unsubstituted,

partially or fully halogenated and/or carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy.

12. The method as claimed in claim 7, wherein

R^5 is a radical $NR^{5b}R^{5c}$, and

R^6 is hydrogen, C_1-C_6-alkyl, which may be unsubstituted, partially or fully halogenated and/or may carry 1, 2 or 3 radicals, selected from the group consisting of cyano, nitro, amino, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio, (C_1-C_4-alkoxy)carbonyl, (C_1-C_4-alkyl)amino, di(C_1-C_4-alkyl)amino and C_3-C_6-cycloalkyl, or is phenyl or phenyl-C_1-C_4-alkyl, wherein the phenyl group in the two last-mentioned radicals may be unsubstituted or may carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of halogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy, or a radical OR^{6a},

wherein R^{6a} has one of the meanings given for R^{5a} in claim 1 and R^{5b} and R^{5c} are as defined in claim 1.

13. The method as claimed in any of claims 1 to 6, wherein A is a radical $N=SR^7R^8$, wherein R^7 and R^8 are as defined in claim 1.

14. The method as claimed in claim 13, wherein R^7 and R^8 are, independently of each other, selected from C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_4-alkoxy-C_1-C_4-alkyl, C_1-C_4-haloalkyl, phenyl and phenyl-C_1-C_4-alkyl, wherein phenyl in the last two radicals may be unsubstituted, partially or fully halogenated and/or carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy,

or R^7 and R^8 together form a moiety $(CH_2)_k$, wherein k is 4, 5 or 6 and wherein 1, 2, 3 or 4 hydrogen atoms may be replaced by C_1-C_4-alkyl or halogen and wherein 1 or 2 non-adjacent CH_2 moieties may be replaced by a carbonyl group, a heteroatom or a heteroatom group, selected from O, S, SO_2 and N-$R^{\#}$ with $R^{\#}$ being H or C_1-C_4-alkyl.

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15. The method as claimed in any of claims 1 to 6, wherein A is a radical of the formula
NR^{10}-C(=O)-R^9 wherein

R^{10} is selected from hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_6-alkoxy, C_1-C_4-alkoxy-C_1-C_4-alkyl, C_1-C_4-haloalkyl and acetyl; and

R^9 is selected from C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_4-alkoxy-C_1-C_4-alkyl, C_1-C_4-haloalkyl, phenyl and phenyl-C_1-C_4-alkyl, wherein phenyl in the last to radicals may be unsubstituted, partially or fully halogenated and/or carry 1, 2 or 3 substituents, independently of one another selected from the group consisting of C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-haloalkoxy, or

R^{10} and R^9 together form a moiety of the $(CH_2)_p$, wherein p is 3, 4 or 5 and wherein 1, 2, 3 or 4 hydrogen atoms may be replaced by C_1-C_4-alkyl or halogen and wherein 1 or 2 non-adjacent CH_2 moieties may be replaced by a carbonyl group, a heteroatom or a heteroatom group, selected from O, S, SO_2 and N-$R^{\#}$ with $R^{\#}$ being H or C_1-C_4-alkyl.

16. The method as claimed in claim 15, wherein

R^{10} is selected from hydrogen, C_1-C_4-alkyl, C_2-C_6-alkynyl and C_1-C_4-alkoxy and in particular from C_1-C_4-alkyl; and

R^9 is selected from C_1-C_4-alkyl, C_2-C_6-alkenyl, C_1-C_4-haloalkyl and phenyl, or

R^{10} and R^9 together form a moiety of the $(CH_2)_p$, wherein p is 3 or 4.

17. The method as claimed in claim 15, wherein

R^9 is C_1-C_6-alkyl or C_1-C_4-haloalkyl, and

R^{10} is hydrogen or C_1-C_6-alkyl.

18. The method as claimed in any of claims 1 to 6, wherein A is a radical of the formula
NR^{10}-C(=O)-R^9 wherein

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R^{10} is selected from hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_6-alkoxy, C_1-C_4-alkoxy-C_1-C_4-alkyl and C_1-C_4-haloalkyl; and

R^9 is OR^{9a} or a radical $NR^{9b}R^{9c}$,

wherein R^{9a}, R^{9b}, and R^{9c} are as defined in claim 1.

19. The method as claimed in any of claims 1 to 6, wherein A is a N-bound 5-membered aromatic heterocycle, which additionally may contain 1, 2, or 3 nitrogen atoms as ring members and which may carry 1, 2, 3 or 4 radicals R^{13}, which are as defined in claim 1.

20. The method as claimed in claim 19, wherein A is 1-pyrrolyl, 1-pyrazolyl, 1-imidazolyl or [1,2,4]-triazol-1-yl, where the heterocycle may be unsubstituted or may carry 1, 2 or 3 substituents selected from halogen and C_1-C_4-alkyl, wherein C_1-C_4-alkyl may be unsubstituted or may be substituted by hydroxy or acetyloxy.

21. A method as claimed in any of the preceding claims , which is a method for protecting crops from attack or infestation by animal pests, which comprises contacting a crop with a pesticidally effective amount of at least one compound of the formula I and/or at least one salt thereof, as defined in claim 1.

22. A method as claimed in any of claims 1 to 20, which is a method for the protection of seeds from soil insects and of the seedlings' roots and shoots from insects comprising contacting the seeds before sowing and/or after pregermination with a compound of the formula I as defined in claim 1 and/or at least one agriculturally acceptable salt thereof, as defined in claim 1, in pesticidally effective amounts.

23. The method as claimed in claim 22, wherein the compound of formula I is applied in an amount of from 0,1 g to 10 kg per 100 kg of seeds.

24. The method as claimed in claim 22 or 23, wherein the resulting plant's roots and shoots are protected.

25. The method as claimed in claim 22 or 23, wherein the resulting plant's shoots are protected from aphids.

26. The use of a cyanopyridine compound of the formula I or a salt thereof as defined in any of claims 1 to 20 for combating animal pests.

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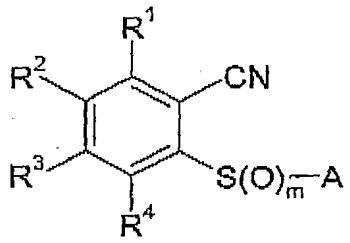
27. Seed comprising a compound of the formula I or an agriculturally useful salt of I, as defined in any of claims 1 to 20, in an amount of from 0.1 g to 10 kg per 100 kg of seed.

28. Cyanobenzene compounds of the formula (I)



(I)

where m, A, R^1, R^2, R^3 and R^4 are as defined in any of claims 1 to 20,

where, however,

R^{16} is C_1-C_6-alkyl, aryl, aryl-C_1-C_4-alkyl,
5- to 7-membered heteroaryl or heteroaryl-C_1-C_4-alkyl, wherein the heteroaryl ring contains as ring members 1,2 or 3 heteroatoms and/or heteroatom groups, selected from the group consisting of nitrogen, oxygen, sulfur, SO, SO_2 and N-R^k, wherein R^k is hydrogen or C_1-C_4-alkyl,

3- to 7-membered heterocyclyl or heterocyclyl-C_1-C_4-alkyl, wherein the heterocyclic ring is saturated or partly unsaturated and contains as ring members 1, 2 or 3 heteroatoms and/or heteroatom groups, selected from the group consisting of nitrogen, oxygen, sulfur, SO, SO_2 and N-R^m, wherein R^m is hydrogen or C_1-C_4-alkyl,

and wherein the carbon atoms of the heterocyclic rings may be unsubstituted or substituted by 1 or 2 radicals selected from halogen or C_1-C_4-alkyl;

or

R^{16} and R^9 together with the adjacent nitrogen and carbon atoms form a saturated or ethylenically unsaturated 5 to 10-membered ring, where the ring may be partially or fully halogenated and/or may be substituted by 1, 2 or 3 substituents selected from C_1-C_6-alkyl and C_1-C_6-haloalkyl, wherein the ring may contain, in addition to the nitrogen and carbon ring members, 1, 2 or 3

heteroatoms and/or heteroatom groups as ring members selected from the group consisting of nitrogen, oxygen, sulfur, SO, SO_2 and N-R^{17};

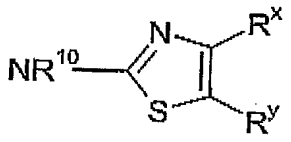
and agriculturally acceptable salts thereof,

except for compounds of the formula I, wherein R^1 is H, NO_2 and NH_2 if R^2 is H, R^3 is H, Cl or CO_2CH_3, R^4 is H, and A is a radical N=CH-N$(CH_3)_2$ and also

except for compounds of the formula I, wherein R^1 is H, R^2 is H or Cl, R^3 is H, R^4 is H and A is an optionally substituted pyridazin-6-on-1-yl-radical or an optionally substituted imidazolin-5-on-1-yl radical, and also

except for compounds of the formula I, wherein R^1 is H, R^2 is H, R^3 is H, R^4 is H and A is a radical N=C(O-ethyl)$_2$. and also

except for compounds of the formula I, wherein A is a radical of the formula



where R^x and R^y are, independently of each other, hydrogen or C_1-C_5-alkyl and R^{10} is H or C_1-C_{10}-alkyl.

29. An agricultural composition comprising at least one compound of the formula I and/or at least one agriculturally useful salt of I, as defined in claim 28, and at least one inert liquid and/or solid agriculturally acceptable carrier.

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